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A.D. 1874, 4th APRIL. N° 1171.

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SPECIFICATION

OF

THOMAS SHORT.

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PURIFYING SEWAGE.

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LONDON:

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A.D. 1874, 4th APRIL. N° 1171.

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### Purifying Sewage.

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LETTERS PATENT to Thomas Short, of Glasgow, in the County of Lanark, North Britain, Portioner, for the Invention of "IMPROVEMENTS IN APPARATUS FOR PURIFYING SEWAGE."

Sealed the 2nd October 1874, and dated the 4th April 1874.

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PROVISIONAL SPECIFICATION left by the said Thomas Short at the Office of the Commissioners of Patents, with his Petition, on the 4th April 1874.

I, THOMAS SHORT, of Glasgow, in the County of Lanark, North  
5 Britain, Portioner, do hereby declare the nature of the said Invention  
for "IMPROVEMENTS IN APPARATUS FOR PURIFYING SEWAGE," to be as follows,  
that is to say:—

This Invention has for its object the purifying of sewage by removing  
from it the various suspended matters and impurities, so that the water  
10 may subsequently flow into a river, canal, or harbour, without polluting  
the water therein.



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*Short's Improvements in Apparatus for Purifying Sewage.*

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The improved apparatus is designed for being applied in the course of any main sewer, a certain length of such sewer being removed for the reception of the apparatus which it is proposed to construct principally of cast iron.

The apparatus is made with an inlet passage communicating through 5  
separate sluice valves with two depositing chambers, and the sewage is  
allowed to flow through one of these chambers when the deposits are  
being removed from the other. In each depositing chamber there are a  
number of baffling plates and gratings which tend to break or arrest the  
currents and thereby favor deposition. The gratings are in the anterior 10  
part of the chamber, and are inclined and arranged so that the water has  
to move upwards or partly upwards in passing through them. Forward  
of the gratings there is in each chamber a pump, by preference of the  
kind known as the archimedian or helical pump, and which is placed  
vertically or at an inclination in a well or compartment, into which the 15  
water flows through small perforations excluding all by the finest  
suspended particles. Forward of the pump the depositing chamber is  
continued in a form with diminishing depth, and is fitted with horizontal  
or other baffle plates to favor deposition. The water flowing up and  
raised by the pump passes on over the top of the forward part of the 20  
depositing chambers towards the continuation of the sewer; it has  
however on its way to the sewer to pass through quantities of animal or  
other suitable charcoal contained in cages arranged so that they can be  
easily removed for emptying and refilling.

In the inlet a water wheel is arranged to be driven by the force of 25  
the inflowing sewage, and this water wheel by suitable gearing and  
shafting drives the pump or pumps and also a screw propeller arranged  
in the outlet from the apparatus. With these arrangements the flow  
of the sewage is by the action of the water wheel temporarily retarded,  
the retardation favoring the deposition of suspended matters; but the 30  
force is utilised by means of the water wheel in working the pump and  
in restoring a large proportion of velocity to the purified water as it  
leaves the apparatus.

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*Short's Improvements in Apparatus for Purifying Sewage.*

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SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said Thomas Short in the Great Seal Patent Office on the 2nd October 1874.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, THOMAS  
5 SHORT, of Glasgow, in the County of Lanark, North Britain, Portioner, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Fourth day of April, in the year of our Lord One thousand eight hundred and seventy-four, in the  
10 thirty-seventh year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said Thomas Short, Her special licence that I, the said Thomas Short, my executors, administrators, and assigns, or such others as I, the said Thomas Short, my executors, administrators, and assigns, should at any time agree with, and no  
15 others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "IMPROVEMENTS IN APPARATUS FOR PURIFYING SEWAGE," upon the condition (amongst others)  
20 that I, the said Thomas Short, my executors or administrators, by an instrument in writing under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within  
25 six calendar months next and immediately after the date of the said Letters Patent;

NOW KNOW YE, that I, the said Thomas Short, do hereby declare the nature of my said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the  
30 following statement in writing, reference being had to the accompanying Drawings, that is to say:—

My said Invention has for its object the purifying of sewage by removing from it the various suspended matters and impurities, so that the water may subsequently flow into a river, canal, or harbour without  
35 polluting the water therein.



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*Short's Improvements in Apparatus for Purifying Sewage.*

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My improved apparatus is designed for being applied in the course of any main sewer, a certain length of such sewer being removed for the reception of the apparatus, which I proposed to construct principally of cast iron.

The apparatus comprises two chambers or compartments peculiarly 5 contrived and fitted with the view of promoting the deposition of suspended matters, and the sewage water is allowed to flow through one of these chambers when the deposits are being removed from the other. The water before finally leaving the apparatus is made to pass through quantities of animal or other suitable charcoal contained in cages 10 arranged so that they can be easily removed for emptying and refilling. The flow of the sewage water in the apparatus is temporarily retarded by the action of a water wheel which it is made to drive on entering, but the force imparted to the water wheel is utilised in working a pump and in restoring a large proportion of velocity to the purified water as it leaves 15 the apparatus.

And in order that my said Invention and the manner of performing the same may be properly understood, I hereunto append a Sheet of explanatory Drawings to be herein-after referred to and representing a modification of my improved apparatus suitable for a main sewer of 20 about three feet eight inches internal diameter. In these Drawings the same reference numerals are used to mark the same or like parts wherever they are repeated.

Figure 1 is a side view and Figure 2 is a plan, whilst Figures 3, 4, 5, are transverse vertical outlines, internal parts being indicated by blue 25 lines in all the Figures.

The apparatus is formed with a flanged inlet 1 at what is represented as the left-hand end for connection to the main sewer in the course of which it is to be placed, and just within this inlet there is formed a chamber or enlargement 2 having fitted within it a paddle wheel 3 which 30 the sewage water turns on entering, losing much of its velocity in doing so. After passing the wheel the water proceeds by a deepening passage 4 to the entrances to two passages 5, 6, commanded by sluices 7; only one of which is in general open at a time. Most of the chambers and spaces herein-after to be described are in duplicate and separated from each 35 other by a longitudinal vertical partition 8 extending almost the entire length of the apparatus, and it will only be necessary to describe one



*Short's Improvements in Apparatus for Purifying Sewage.*

set and the parts appertaining thereto. By the passage 5 (best seen in Figure 2) the water enters a depositing chamber 9, the bottom 10 of which is formed with large openings leading into what may be termed a mud chamber 11 below. In the chamber 9 there are a number of baffling plates 12 and gratings 13 which tend to break or arrest the currents and thereby favor deposition. The gratings 13 are in the anterior or front part of the chamber 9, and are inclined and arranged so that the water has to move upwards or partly upwards in passing through them. The space 14 forward of the grating 13 communicates with a front mud chamber 15, and there is constructed so as to dip into the intermediate space a chamber 16 formed by a back perforated partition 17 which is nearly vertical, and by a forward perforated partition 18 which is inclined and is formed with horizontal baffling plates 19 to favor deposition. Within the chamber 16 there is an open topped cylindrical well or compartment 20 into which the water flows through very small perforations, excluding all but the finest suspended particles, the chamber 16 being otherwise closed in at the top. In the well 20 there is a pump 21 which is by preference of the kind known as the archimedian or helical pump, and which may be placed vertically as shown, or at an inclination. The mud chambers 11, 15, are formed with inclined bottoms 22, 23, at the middle of the apparatus to favor the lodging of the mud towards the ends, from which parts it is to be periodically removed by means of pumps arranged to exhaust it through pipes 24, 25. The central pumps 21 are worked by gearing 26, receiving motion through a longitudinal horizontal shaft 27, indicated by a red line, from the water wheel 3. The water flowing up and raised by the pump 21 passes on over the top of the forward part of the chamber 16 towards the continuation of the sewer; it has however on its way to the sewer to pass through charcoal, as herein-before mentioned. The charcoal is contained in rectangular iron boxes or cages formed with close sides and bottoms, whilst the front and back ends are made with the upper halves of perforated metal plates having half-inch holes about an inch from centre to centre, and with the lower halves of three-eighths inch vertical rods with three-quarters inch spaces. The cages are fitted with antifriction rollers at the corners to bear on vertical guide bars in spaces 28, 29, formed for them near the forward end of the apparatus and in the course of the outflowing water. Close fitting doors are provided in the top of the apparatus over the spaces 28, 29, to admit of the introduction and removal of the charcoal cages. Finally, in the



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outlet 30 leading to the continuation of the sewer there is a screw propeller 31 driven by a continuation of the shaft 27, which as herein-before stated derives its motion from the water wheel 3 at the entrance, and this propeller restores to the outflowing water some of the velocity which it had at the inlet. 5

Having thus particularly described my said Invention and the manner of performing the same, I have to state that I do not restrict myself to the precise details herein described or delineated, but that what I believe to be novel and original, and claim as the Invention secured to me by the herein-before in part recited Letters Patent is, the 10 arranging or combining together of the parts of apparatus for purifying sewage, substantially in the improved manner herein described and delineated.

In witness whereof, I, the said Thomas Short, have hereunto set my hand and seal, this First day of October, in the year of our 15 Lord One thousand eight hundred and seventy-four.

THOMAS SHORT. (L.S.)

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LONDON:

Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,  
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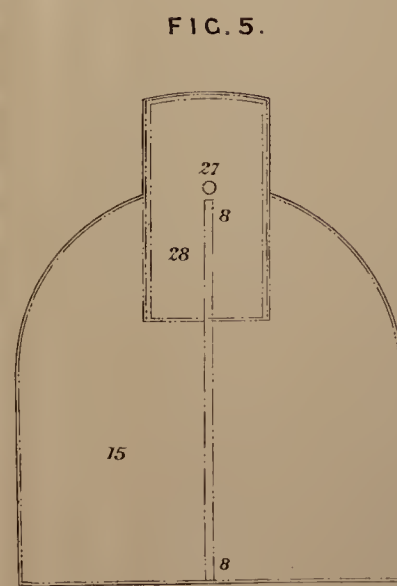
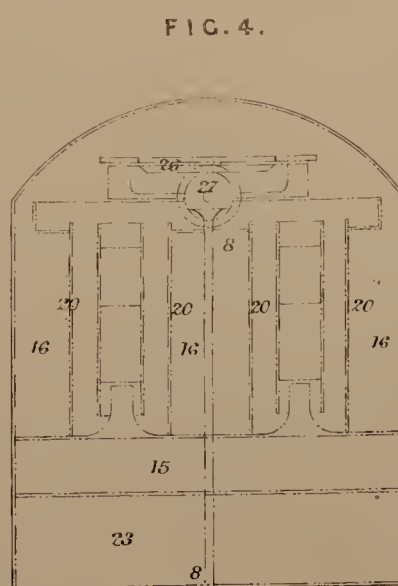
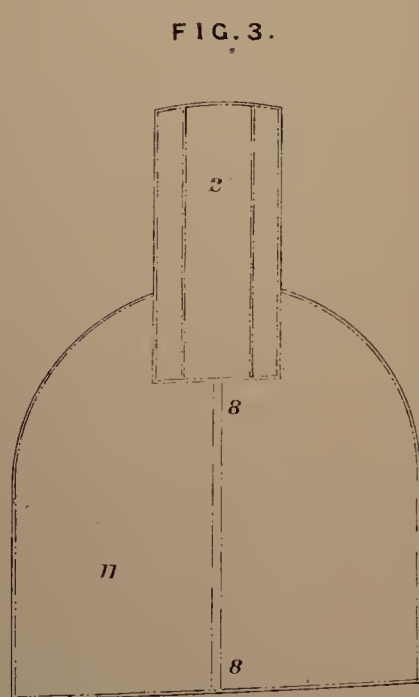
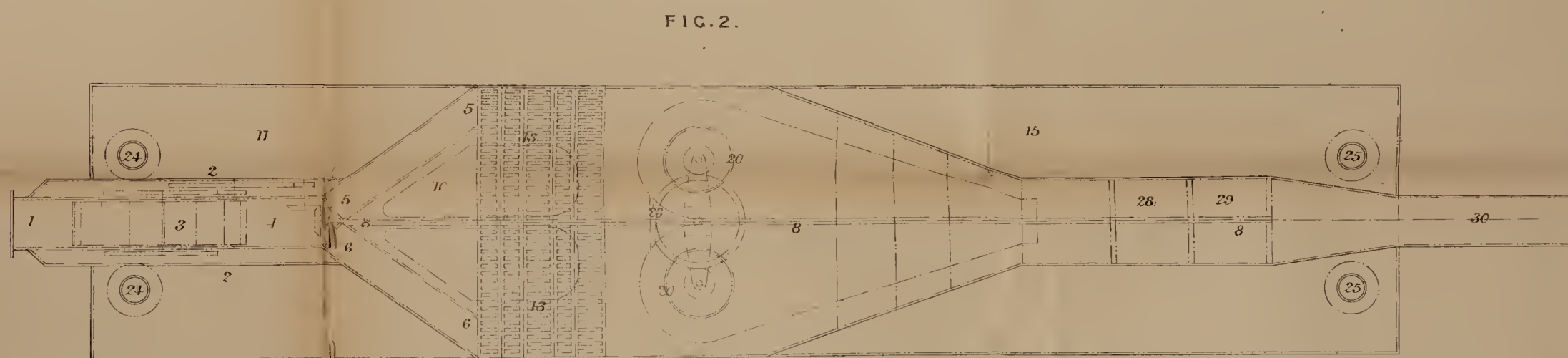
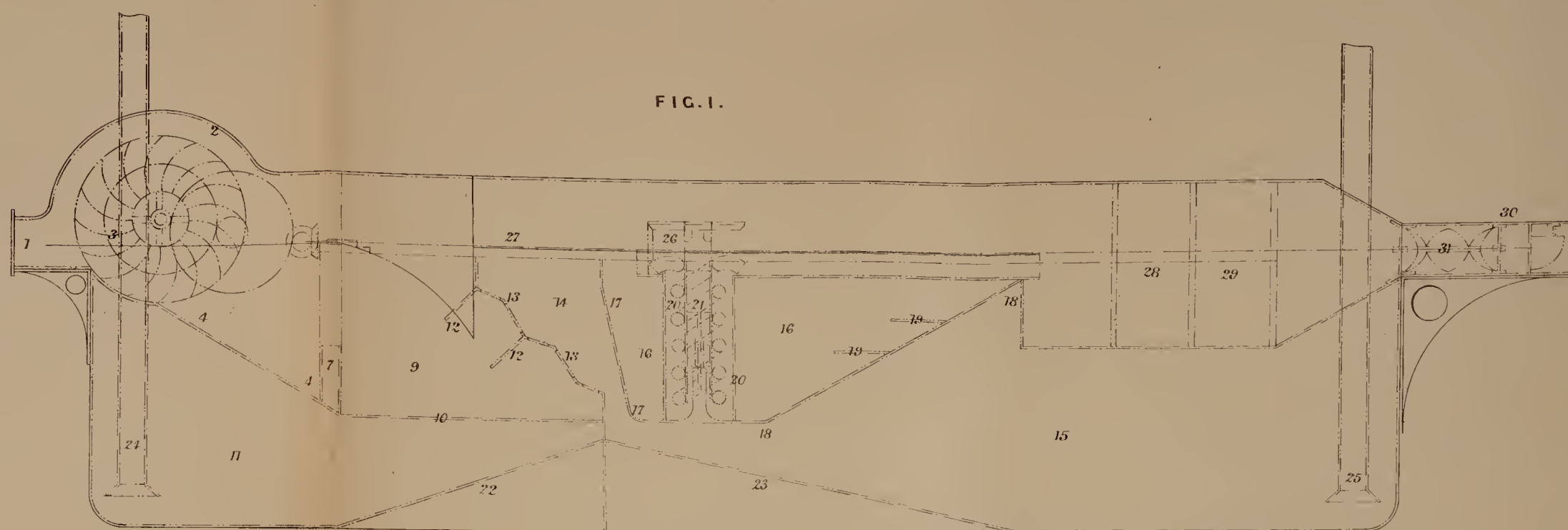












Scale  $\frac{1}{8}$  in = 1 Foot.



